DOI: 10.5958/0976-2469.2021.00049.X

LIBRARY HERALD
Vol 59 No 4
December 2021

A Bibliometric Assessment of Bibliometric Studies on Covid-19 Research Publications

KANU CHAKRABORTY*
S. SAHOO**
S. B. GAJBE**
P. K. SINHA**
S. DEBNATH***
S. S. MAHATO****

Covid-19 pandemic has impacted all forms of global research since March 2020. More than 1.5 lakh scholarly publications relevant to all areas of COVID-19 in different formats are published all over the world. Researchers are still looking for a complete cure for this condition; while a few vaccines are currently available, research on this front is still ongoing. This research aims to perform a bibliometric assessment of 63 bibliometric studies on Covid-19 research publications, derived from Scopus database. Bibliometric R (biblioshiny) and MS-Excel were used to perform data analysis. The 63 selected bibliometric studies are spread across 42 different sources (journals) and involve 231 authors. Seven authors have solely authored and the rest 224 have collaboratively worked on 63 articles. The study showed that collaborative work outnumbers single-authored work by a factor of the collaborative index of four. The most relevant source is *Library Philosophy and Practice*; the most cited source is Scientometrics. The most cited and most productive author is Y. Wang, from the University of Idaho Library.

Keywords: *Covid 19, Coronavirus, Pandemic, Bibliometric Studies, Bibliometrics, Scientometrics.*

* Indian Institute of Technology (BHU), Varanasi, U.P. India.

** DRTC, Indian Statistical Institute and University of Calcutta, Kolkata, West Bengal, India.

*** NIT-Tiruchirappalli, Tamil Nadu, India.

**** IISER-Pune, Maharashtra, India.

Corresponding Author: S.S.Mahato. E-Mail. shiva@iiserpune.ac.in

1 INTRODUCTION

Scientists identified coronavirus for the first time in 1968. The International Committee on Virus Taxonomy established the Corona Viridae family in 1975 [1,2]. In 2003, the World Health Organization [3] identified this novel respiratory infection in Guandong, China. Before discovering SARS-COV, two human coronavirus prototypes, OC43 and 229E, were discovered in humans, causing common cold. SARS-COV causes a more severe respiratory syndrome in humans [4]. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2) is the coronavirus responsible for the recent outbreak in Wuhan. The coronavirus disease 2019 (Covid-19), caused by the SARS-CoV-2, spread rapidly worldwide in 2020 [5]. This spread caused the World Health Organization (WHO) to declare Covid-19 as a global pandemic on March 11, 2020. At the same time, the world aspired to have Covid-19 vaccinations widely available by 2021 [6], and the researchers have been successful to do so. Covid-19 was, without a doubt, the hottest topic in 2020. The scientific community has conducted extensive research in various domains to address this global crisis, including tracing the virus's origins, developing new cures, and assessing the pandemic's environmental and socioeconomic impact.

The WHO Coronavirus (Covid-19) Dashboard (https://covid19.who.int/) claims that as of July 14, 2021, a total of 3,402,275,866 vaccine doses were administered worldwide. As of July 15, 2021, WHO had received reports of 188,128,952 confirmed cases of COVID-19, with 4,059,339 deaths. The worst-affected countries were, the United States (33,604,822) and India (30,987,880), with Brazil coming in third (19,151,993). According to the transmission classification, the United States is in the community transmission category, India is in the clusters of cases category, and Brazil is likewise in the community transmission category.

The research community has been working throughout the world to learn more about the virus's properties. As a result, the scientific community's interest in Covid-19 research has risen. We have seen the research on Covid-19 carried out in various aspects as well. All these multifaceted studies led to an enormous amount of publications in the field of Covid-19 research. Library and information science domain has developed bibliometrics, a method that assesses the research trend using quantitative and qualitative indicators to study a large amount of literature on any topic [7,8]. Bibliometrics has been applied as a method to evaluate the research trend of various targeted topics of interest in several studies. Of late, bibliometrics was frequently used to examine the Covid-19 research trend, and many of the works related to COVID-19 bibliometric studies were published. As a result, there was a need to examine the multiplicity of bibliometric studies and transparently provide them so that the scientific community interested in such studies may identify, investigate, and know the research trend.

11 LITERATURE REVIEW

Only two bibliometric studies on this theme have been performed in the past. Among them, Sinha et al. (2021) provided a parametric review of the Covid-19 bibliometric studies[9], based on 39 existing studies using 19 parameters deriving data from Scopus database. The 19 parameters studied were broken down into general and granular parameters. While general parameters provided an overview of the bibliometric study under consideration, granular parameters highlighted the study's core finding. The study discovered that 14 papers were published in medical journals, with LIS journals following closely behind (10 papers). A variety of databases, including MEDLINE, Scopus, and Web of Science (WoS) were used by the studies. The studies lasted between three months and fifty years. In terms of results, the USA was identified as the most productive country in twenty studies, while the University of Hong Kong was the most productive institution in 13 studies. The *Journal of Virology* was identified as the most productive journal in eight studies, with Covid-19 as the most frequently used keyword.

Silva et al. (2020) presented a systematic review of the available bibliometric data on SARS-CoV-2 [10]. The authors conducted a search in the Scopus, Web of Science, and Google Scholar databases on 10th June 2020 and retrieved 95 articles. These 95 articles were further whittled down to 30 documents using repetitive filters, including full-text availability, quantitative synthesis, and de-duplication. The study noted that 24 of the 30 studies examined SARS-CoV-2, while the remaining six examined coronaviruses. Fourteen studies were in the preprint stages of publication. The number of papers in the bibliometric studies ranged from 153 to 21, 395. Scopus was the most frequently used database, with 15 studies utilising it, followed by PubMed (14). Covid-19 and SARS-Cov-2 were two of the most frequently used terms in the studies.

2 OBJECTIVES

The study was designed to examine both qualitative and quantitative aspects of bibliometric studies on Covid-19 research. In particular, the study focused on: (i) The overall research output of bibliometric Studies performed on Covid-19 globally in terms of authors, affiliations, distribution by broad subject areas, and global share of top 10 most productive countries; and (ii) The global research output of bibliometric studies performed on Covid-19 in terms of the word count (Titles, Abstract, Authors Keywords, and Keywords plus), research output in terms of most- cited sources, authors, co-authors networks.

3 MATERIALS AND METHODS

In order to perform the quantitative assessment of bibliometric studies on

Covid-19 research, the well-known multidisciplinary, citation, and bibliographic database Scopus (http://www.scopus.com) was used as the primary source of indexed publications. The keywords “Covid-19” and “Bibliometric*” were searched in the article title (joined by Boolean operator “and”) that fetched a total of 91 results. After that, the search was restricted to only “article” with publication stage “final” and language as “English”. After filtration, 63 articles were selected for further study. The search string Title (”Covid 19" and ”Bibliometric*”) and (Limit to (Pubstage, ”final”)) and (Limit-To (Doctype, ”ar”)) and (Limit to (Language, ”English”)) was used. The search was performed on 19 July 2021, and records indexed up to this date were included in the study. This search led to the identification of 63 documents. Scopus database allows downloading the bibliographic data in various formats. For this work, the data was downloaded in the CSV and Bibtex file format. For data analysis, the statistical tool R (Bibliometrix package) and Microsoft Excel were used. The Bibliometrix package is a built-in R environment to conduct bibliometric studies [11]. Graphs from the Scopus analysed data were used for presenting the results of the study.

Among related studies, Grover and Gupta (2021) conducted a bibliometric analysis of children and adults’ mental health and well-being during the COVID-19 pandemic [12]. The authors searched the Scopus database for articles published prior to 1 May 2021, retrieved 1797 articles from 118 countries, and analysed them further. The study discovered that the USA, China, and the U.K. contributed 28.05 percent, 13.97 percent, and 13.69 percent, respectively, of total publications worldwide. The most frequently used keywords were mental health, anxiety, and depression. Additionally, the study noted that out of 118 countries, the top ten countries contributed 95.55 percent of the total research, with most of these top countries being high-income countries. Kodandarama and Chandrashekara M. (2021) studied the Covid-19 publications in the BRICS countries and performed a bibliometric analysis on them [13]. The authors found that China was the most productive country among the BRICS nations, with 5641 publications.

4 ANALYSIS AND RESULTS

41 OVERALL SUMMARY

The core bibliographic information of Covid-19 bibliometric studies is categorised in Table 1, in terms of time-span, sources, documents, document contents, authors, and author collaboration. There are 63 documents spread across 42 different journals containing 2648 references.The average number of citations per document is 4.81. Further, this study has 231 authors in various documents, where seven are single-authored, and 224 are multi-authored

documents. The average number of documents per author is 0.273, and the average number of authors per document is 3.67. The collaborative index is 4, indicating that more collaborative work has been done in this area of research. One of the most critical aspects of document retrieval is the keyword, as it aids in retrieving documents from databases. We typically find two types of keywords in Scopus database: *keyword plus* and author's *keywords*. Databases use the keyword plus feature to standardize keywords, and the author's keyword feature is used by authors to convey essential concepts in their documents.

Table 1: Main Information about Data

Description	Results	Description	Results
Main information about data		**Authors**	
	2020:2021	Authors	231
Sources (Journals)	42	Author Appearances	246
Documents	63	Authors of single-authored documents	7
Average years from publication	0.444	Authors of multi-authored documents	224
	8.694	**Authors collaboration**	
Average citations per year per doc	4.806	Single-authored documents	7
References	2648	Documents per Author	0.273
Document contents		Authors per Document	3.67
Keywords Plus (ID)	289	Co-Authors per Documents	3.9
Author's Keywords (DE)	167	Collaboration Index	4

42 DOCUMENT ANALYSIS

Research articles are essential products for generating new knowledge in a research environment. The impact of research, researchers, and sources are measured with the help of various parameters viz. the number of documents published by authors, documents by affiliation, documents by subject area, documents by country, etc. Numerous parameters are used to determine the impact of research; however, the parameters listed in Figure 1 are used for bibliometric studies in a particular domain. The documents by author parameter in Figure 1 represent the top ten most productive authors who published the most number of research papers on the bibliometric study of Covid-19 research. Kambhampati and Vaishya are the most productive authors who have contributed three research papers each. The other eight researchers listed in Figure 1 published two research papers each.

The document by affiliation parameter describes the most productive institution that has contributed the highest number of research articles on Covid-19 bibliometric research. Pontificia Universidad Javerlanahas contributed four research papers to this study. The Indraprastha Apollo Hospitals, Symbiosis

International Deemed University, and Sri Dhaarti Orthopaedic are the most productive institutions after the Pontificia Universidad. The rest of the institutions shown in Figure 1 contributed two research papers in the bibliometric study of Covid-19.

The document by subject area is one of the essential features of research because it helps to identify the multidisciplinary nature of the research. This parameter also describes the contribution of the particular research domain with respect to other domains. As per Figure 1, the most contributions come from the Social Sciences domain, which contributed 25.7 % of the research work. Medicine produced the second most research (23.9 %), Arts & Humanities contributed 11%, and the remaining 39.4% of research came from Environmental Science, Computer Science, Biochemistry, Engineering, Business Management, Energy and Nursing.

The document by country parameter identifies the most productive country in a particular research area. In the bibliometric study of Covid-19, India is the most productive country and has contributed thirteen research papers, followed by China with seven research papers. The third most productive countries are Colombia and Indonesia, with four research papers each. Australia, Brazil, Canada, Peru, Spain, and Taiwan have contributed three papers each.

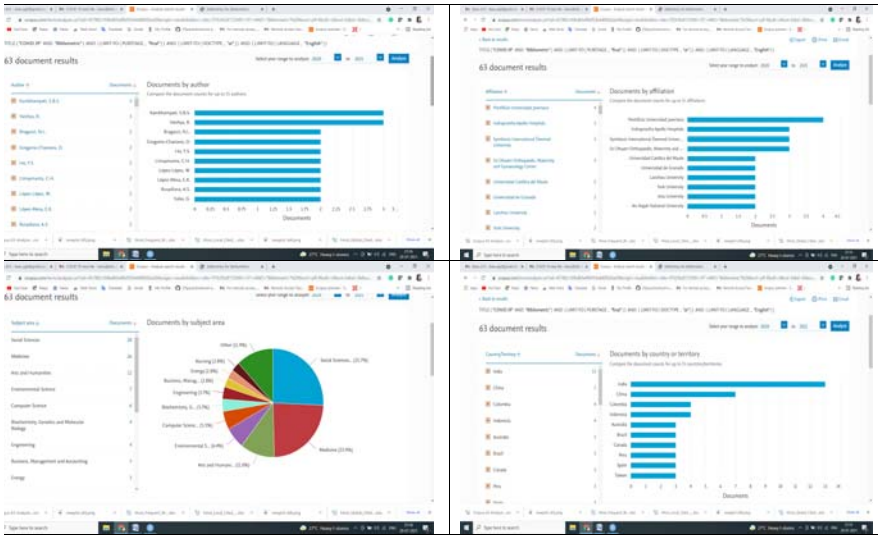

Figure 1: Document Analysis

43 KEYWORD ANALYSIS

The concept of word-count helps identify the core concepts and related concepts of the research under study. In a research paper, core concepts or essential ideas can come from various parts of the paper. It may be from the title section, abstract section, author keywords, keyword plus, etc. However, an excellent way is to aggregate similar concepts in one place. From Figure 2, it is evident that Covid-19 and bibliometric analysis are the frequently used concepts in all the sections of the research articles. The graph below indicates the frequently occurred concept in this study.

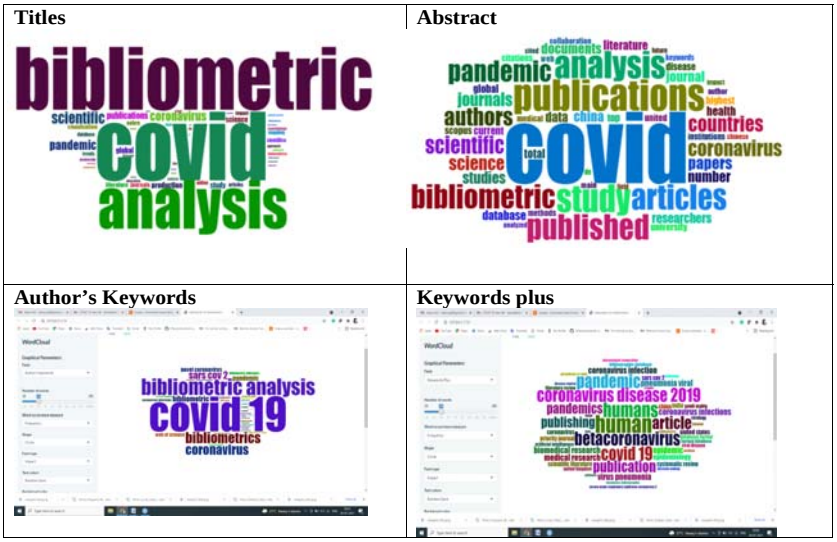

Figure 2. Keywords Analysis

44 MOST CITED SOURCES

In scientific research, citation plays a vital role in identifying the impact of journals, articles, researchers, etc. Again, in academia, it is believed that the more citation a particular entity receives, the more impact that entity creates in the research field. So, from Table 2 we can conclude that *Scientometrics* has made more impact in the bibliometrics field of Covid-19 from where 90 articles have been cited, followed by *Science of the Total Environment* which received citations from 46 articles. *The Lancet* is the third most cited source with 45 citations.

Table 2. Most Cited Sources

S.No	Name of the Source	No. of articles
1	Scientometrics	90
2	Science of the Total Environment	46
3	The Lancet	45
4	Nature	36
5	New England Journal of Medicine	34
6	Sustainability	25
7	International Journal of Environmental Research & Public Health	22
8	Cureus	21
9	Science	20

45 MOST CITED AUTHORS

Table 3 shows the top ten cited-authors in Covid-19 research. Wang Y is the most impactful author in this field with 39 citations, followed by X.Li with 27 citations. The authors J. Li, L.Zhang and S.H. Zyoud are the third most-cited authors with 23 citations each, closely followed by W. Wang (with 22 citations, 6th rank). Y. Hu received 20 citations, followed by S. W. Al Jabi, C. Huang and L. Waltman, receiving 19 citations each.

Table 3. Most Cited Authors

S.No	Name of the authors	No. of citations
1	Y.Wang	39
2	X. Li	27
3	J. Li	23
4	L. Zhang	23
5	S.H. Zyoud	23
6	W. Wang	22
7	Y. Hu	20
8	S.W. Al Jabi	19
9	C. Huang	19
10	L. Waltman	19

46 MOST RELEVANT SOURCES

Information sources are the most critical factors in research to disseminate knowledge in academia. Journals are one of the most prestigious channels to publish research findings in an academic environment. Researchers mainly prefer it due to its peer review features as compared to others.

Table 4 demonstrates the top ten sources that contributed the most number of papers. *Library Philosophy and Practice* dominates the list (with 12 articles), followed by *Diabetes and Metabolic Syndrome: Clinical Research & Reviews* and *Science Editing* (with 3 articles each). The journals *Biomedica, Healthcare, International Journal of Environmental Research & Public Health, Malaysian Journal of Library & Information Science, Medical journal of the Islamic Republic of Iran* and *Sustainability* published (only 2 articles each).

Table 4. Most Relevant Sources

S. No	Name of the sources	No. of articles
1	Library Philosophy and Practice	12
2	Diabetes and Metabolic Syndrome: Clinical Research and Reviews	3
3	Science Editing	3
4	Biomedica : Revista Del Instituto Nacional De Salud	2
5	Healthcare (Switzerland)	2
6	International Journal of Environmental Research & Public Health	2
7	Malaysian Journal of Library & Information Science	2
8	Medical Journal of The Islamic Republic Of Iran	2
9	Sustainability (Switzerland)	2
10	Acta Biomedica	1

47 MOST GLOBAL CITED DOCUMENTS

Table 5 depicts the top ten most-cited research articles in Covid-19 research. The most cited document is 'Investigating the emerging Covid-19 research trends in the field of business and management: A bibliometric analysis approach' authored by S. Verma S and A. Gustafsson and is published in the *Journal of Business Research*. This article received 69 citations across various domains. The second most cited document is 'Unprecedented surge in publications related to COVID-19 in the first three months of the pandemic: A

bibliometric analysis report' with 37 citations. The article is published in the *Journal of Clinical Orthopaedics and Trauma* and is written by Kambhampati, B.S. Srinivas, Raju Vaishya, and Abhishek Vaish. The other document, 'Bibliometric analysis of global scientific research on Coronavirus (Covid-19)' written by H. Dehghanbanadaki, F. Seif, , Y. Vahidi, F. Razi, F. Hashemi, M. Khoshmirsafa and H. Aazami has also created significant impact in Covid-19 research with 25 citations.

Table 5. Most Global Cited Documents

Paper with source detail	**No. of citations**	**Total citations per year**
S. Verma , 2020, J Bus Res	69	34.5
S.B.S Kambhampati, 2020, J Clin Orthop Traum	37	18.5
H. Dehghanbanadaki, 2020, Med J Islam Repub Iran	25	12.5
J. Fan, 2020, Front Public Health	19	9.5
A. Aristovnik, 2020, Sustainability	16	8
S.H. Zyoud, 2020, Bmc Infect Dis	15	7.5
E. Herrera-Viedma, 2020, Prof Inf	14	7
A. Odone, 2020, Acta Biomed	13	6.5
I. Hamidah, 2020, Indones J Sci Technol	13	6.5
G. Tanrä-Verdi, 2020, J Air Transp Manage	11	5.5

48 THREE-FIELDS-PLOT (SOURCES, AUTHORS, KEYWORDS)

The three fields plot parameter gives an excellent overview of different concepts used by different individuals in various sources. This graph helps to see how frequently different personalities use a concept in different sources. Here, the size of the rectangle tells the frequency of occurrence of words. The bigger the size of the rectangle, the more the occurrence of words. Figure 3 suggests, the keyword Covid-19 is used by almost every researcher in almost every journal. So, "Covid 19" keyword is the most used in this study. The term "bibliometrics" is the second most used keyword by authors to perform research. Similarly, "bibliometrics analysis", "SARS-CoV-2" and "Web of Science" are also frequently used by authors in different sources.

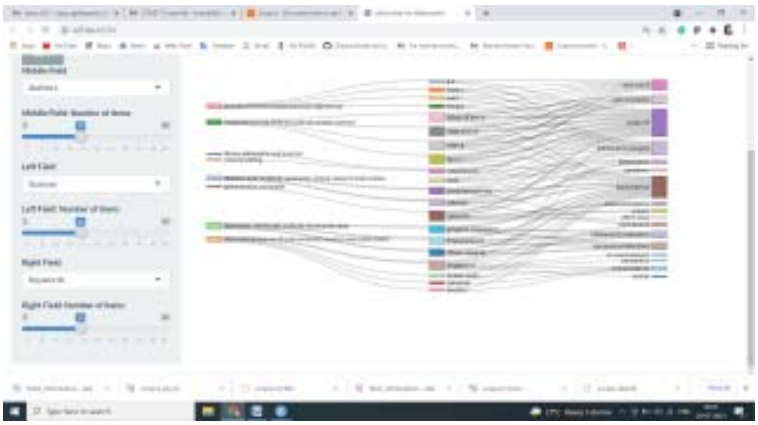

Figure 3: Three-Fields-Plot (Sources, Authors, Keywords)

49 CO-AUTHORS NETWORK

The co-author network tells us the nature of the research performed in this study. Here, in this study maximum number of studies are collaborative work, and this collaboration is between different groups. The colour represents and distinguishes the groups; the red group has maximum collaboration than blue and green colored groups. However, Y. Wang (blue) has maximum research papers compared to other researchers in the group. Similarly, Chen and Yang are the height contributors in the green and red groups, respectively. The colour indicates a similar interest in the topics.

Figure 4. Co-authors network

5 DISCUSSIONS AND FINDINGS

In this study, authors have found 63 documents spread across 42 different sources (journals). The 63 documents contain 2648 references and the average number of citations per document is 4.816. The average number of documents per author is 0.27, and the average number of authors per document is 3.67. The collaborative index is 4, indicating that more collaborative work has been done in this area of research. Kambhampati and Vaishya are the most productive authors who have contributed three research papers, and Pontificia Universidad Javerlana has contributed four research papers to this study. Most contributions come from the Social Sciences domain, which contributed 25.7 % of the research work. Medicine produced the second most research (23.9%), Arts and Humanities contributed 11%. India is the most productive country and has contributed thirteen research papers, followed by China with seven research papers. It is found that Covid-19 and Bibliometric analysis are the frequently used concepts in all the sections of the research articles. *Scientometrics* has made more impact in the bibliometrics field of Covid-19, from where 90 articles have been cited, and Y. Wang is the most impactful author in this field with 39 citations, followed by X. Li with 27 citations.

"Bibliometric study on Covid 19" article has been published during 2020-21 as Covid started end of 2019. Twenty-eight articles were published during 2020, and thirty-five has been published up to 20th July 2021. Sixty-three articles published by forty-two sources, *Library Philosophy and Practice* (19%) dominate the list with twelve research articles, followed by *Diabetes and Metabolic syndrome: Clinical Research and Reviews* (5%) and *Science editing* (5%) having three articles each. The most cited document is "Investigating the emerging COVID-19 research trends in business and management: A bibliometric analysis approach" authored by S. Verma and A. Gustafsson, which is published in the *Journal of Business Research*. This article received 69 citations across the domain. Various databases are available for the scientific community to retrieve their required information using multiple keywords and parameters. We have found Web of Science was used in 30 studies, Scopus was used in 28 studies and PubMed-Medline was used in 16 studies. Fan J et al. work used multiple databases (EMBASE, SCOPUS, Chinese Biomedical Database (SinoMed), China National Knowledge Infrastructure(CNKI), VIP information/ Chinese Scientific Journals database (VIP) and WANFANG) for his study "Bibliometric Analysis on Covid-19: A Comparison of Research Between English and Chinese Studies". The latest studies have used a time-span up to 7th July 2021 (Fonkou M.D.M, et al. 2021) [14]. The maximum study time-span was between Dec-19 to Dec-2020. The shortest time-span was January 7, 2020 to February 7, 2020 by Lan R. et al. (2020) [15]. Most of the

paper used CSV or MS-Excel data format for data analysis. Some papers also used RIS format like (Hamidah I., 2020) [16] and TXT format (Al-Zaman M.S, 2021) [17]. N V.R., Patil S.B. (2020) [18] used more than one format like Excel and Bibtex. Abd-Alrazaq A. et al., (2021) [19] analysed followed by Zyoud S.H., Al-Jabi S.W., (2020) [20] 19044, and Khakimova A.Kh. (2021) [21] 17140, whereas Rajput V., Mulay P., (2020) analysed only 32 studies [22].

The most productive subject area is Medicine, followed by COVID-19 and Epidemiology. Y. Wang,. V. Wiwanitkit and Yuen Kwok-Yung are the most productive authors. Huazhong University of Science & Technology is the most productive organisation, followed by the University of Hong Kong and the Technological University of Pereira. China is the most productive country as it is mentioned in 26 different studies, followed by the USA in 21 and Africa in 2 studies. In comparison, India is mentioned only in one study by N V.R. and S.B.Patil (2020) [18]. *British Medical Journal* (BMJ) is the most productive source, followed by the *Journal of Medical Virology* and *The Lancet*. Most of the studies present co-authorship networks, keyword co-occurrence and co-citation networks. Twenty-nine studies used various versions of VOSviewer, followed by MS-Excel (6), R Biblioshiny software (4). SciMAT & CiteSpace were used in 3 studies. Some of the studies used multiple softwares. like H. Dehghanbanadaki et al (2020) used Excel, GunnMap 2, VOSviewer and V. Rajput., P. Mulay. (2020) [22].

6 CONCLUSION

Covid-19 topic is trending among the researchers as well in the publishing houses. We have seen rapid growth in this field within one and a half years. This study provides an overview and bibliometric assessment of bibliometric studies of published articles on the topic, Covid-19. Bibliometric studies has been quite a popular theme in the recent time, thereby providing a domain for researchers specialising in this field. Collaborative work is remarkable among the authors; only seven articles were found written by single authors. Social Sciences domain contributed a maximum percentage of research work compared to other domains, and India is the most productive country and has contributed maximum research papers. Keywords have been taken from the title section, abstract section, author keywords, and keyword plus. Bibliometric, Covid-19, Human, Coronavirus disease, pandemic keywords have appeared multiple times. *Scientometrics* has created more impact in the bibliometrics field of Covid-19, Y. Wang is the most impactful author and *Library Philosophy and Practice* dominate in this study. Based on the number of citations, Verma and Gustafsson are the most productive authors and the *Journal of Business Research* is the most productive source. This study will be impactful for the researchers who are working in the field of bibliometrics.

REFERENCES

1. Almeisda, J.D., Berry, D. M., Cunningham, C.H., Hamre, D, Hofdtad, M.S, Mallicci, L, Mcintosh, K and Tyrrell, D. A. Coronaviruses. *Nature*, (220); 1968; p650. (Visited on: August 2, 2020).
2. Weiss, S.R and Navas-Martin, S. Coronavirus pathogenesis and the emerging pathogen severe acute respiratory syndrome coronavirus. *Microbiology and Molecular Biology Reviews (2005)*. 69, 4:635-64.
3. World Health Organization. Severe acute respiratory syndrome (SARS). Weekly Epidemiological Record. *Relevé épidémiologique hebdomadaire*. 78, 13; 2003; p89-89.
4. Rota, P. A, Oberste, M. S, Monroe, S. S, Nix, W A, Campagnoli, R, Icenogle, J. P, Penaranda, S, Bankamp, B, Maher, K, Chen, M. H and Tong, S. Characterization of a novel coronavirus associated with severe acute respiratory syndrome. *Science*. 300, 5624; 2003; May. p1394-1399.
5. World Health Organization. Coronavirus disease (Covid-19) pandemic. https://www.who.int/. (*Visited on*: August 1, 2020).
6. Ji, B, Zhao, Y, Wei, T and Kang, P. Water science under the global epidemic of Covid-19: Bibliometric tracking on Covid-19 publication and further research needs. *Journal of Environmental Chemical Engineering*. 9,4; 2021; 105357. DOI 10.1016/j.jece.2021.105357.
7. Campbell, D, Picard-Aitken, M, Cote, G, Caruso, J, Valentim, R, Edmonds, S, et al. Bibliometrics as a performance measurement tool for research evaluation: The case of research funded by the National Cancer Institute of Canada. *American Journal of Evaluation*. 31,1; 2010; p. 66-83. DOI 10.1177/1098214009354774.
8. Pritchard, A. Statistical bibliography or bibliometrics. *Journal of Documentation*. 1969;25(4):348-9.
9. Sinha, P.K, Sahoo, S, Chakraborty, K, Gajbe, S. B, Debnath, S and Mahato, S S. A parametric review of bibliometric studies related to COVID-19. *Library Philosophy and Practice* [online]. 2021.
10. Silva, T. F, Delmelo, A. A, Dossantos, D.L.A, Vaz, E.C, Corvalan, L.C.J, Delacerda, R. M and Rodrigues, F.M. Systematic review of bibliometric studies on SARS-CoV-2. *Health Sciences Journal*. 2020. Vol. 10, no. 3, p116-125.
11. Aria, M and Cuccurullp, C. Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of informetrics*. 11,4; 2017, Nov. p959-975.
12. Grover, S, GUPTA, B. M and Mamdapur, G. M. Impact of Covid-19 on mental health of children & adolescents: A bibliometric assessment of global publications. Journal of Indian Association for Child and Adolescent Mental Health-ISSN 0973-1342. 2021. Vol. 17, No. 3, p167-81.
13. Kodandarama, K and Chandrashekara, M.C.M. Covid 19 Researches by BRICS' nations: A bibliometric study. *Library Philosophy and Practice*

[online]. 2021. Vol. 2021. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85105825047&partnerID=40&md5 =6970013fdab7b542d555159c699e28e1

14. Fonkou, M.D.M, Bragazzi, N.L, Tsinda, E. K, Bouba, Y, Mmbando, G.S. and Kong, J.D. Covid-19 Pandemic related research in Africa: Bibliometric analysis of scholarly output, collaborations and scientific leadership. *International Journal of Environmental Research and Public Health*. 2021. Vol. 18, no. 14, 7273.
15. Lan, R, Jiang, P, Wang, Y, Ye, M and Ou, R. Instant response to the novel virus: A bibliometric analysis of the incipient publications on Covind-19. *Malaysian Journal of Library & Information Science*. 2020 Dec 24, Vol. 25 no. 3, p91-101.
16. Hamidah, I, *Sriyono,* S and Hudha, M. N. A Bibliometric analysis of Covid-19 research using VOSviewer. *Indonesian Journal of Science and Technology*. 2020 Vol. 5, no. 2, p209-16.
17. Al-Zaman, M. A bibliometric and co-occurrence analysis of COVID-19–related literature published between December 2019 and June 2020. *Science Editing*. 2021 Feb 20 Vol. 8, no. 1, p57-63.
18. Patil, S B. Indian publications on SARS-CoV-2: A bibliometric study of WHO Covid-19 database. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews.* 2020 Sep 1. Vol. 14, no. 5, p1171-8.
19. Abd-Alrazaq, A, Schneider, J, Mifsud, B, Alam, T, Househ, M, Hamdi, M and Shah, Z. A comprehensive overview of the Covid-19 literature: Machine learning-based bibliometric analysis. *Journal of Medical Internet Research*. 2021 Mar 8. Vol. 23, no. 3, p23703.
20. Zyoud, S.H and Al-Jabi, S.W. Mapping the situation of research on coronavirus disease-19 (COVID-19): A preliminary bibliometric analysis during the early stage of the outbreak. *BMC Infectious Diseases.* 2020. Vol. 20, no. 1, p1-8.
21. Khakimova, A. K, Zololotarev, O.V and Berbeerova, M.A. Coronavirus infection study: Bibliometric analysis of publications on Covid-19 using PubMed and Dimensions databases. *Scientific Visualization*. 2020. Vol. 12, no. 5.
22. Rajput, V and Mulay, P. Bibliometric survey on impact of sound therapy on blood pressure and Covid-19.. 2020 Apr 1. p1-20.